

Design and Technology



Year 5

EYFS (Reception) Key Stage 1 and 2

Cooking and nutrition

Where food comes from, balanced diet, preparation and cooking skills. Kitchen hygiene and safety. Following recipes.



**Mechanisms/
Mechanical systems**

Mimic natural movements using mechanisms such as cams, followers, levers and sliders.



Key Stage 2

Structures

Material functional and aesthetic properties, strength and stability, stiffen and reinforce structures.



Textiles

Fastening, sewing, decorative and functional fabric techniques including cross stitch, blanket stitch and appliqué.



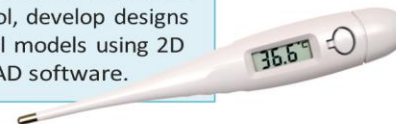
Electrical systems

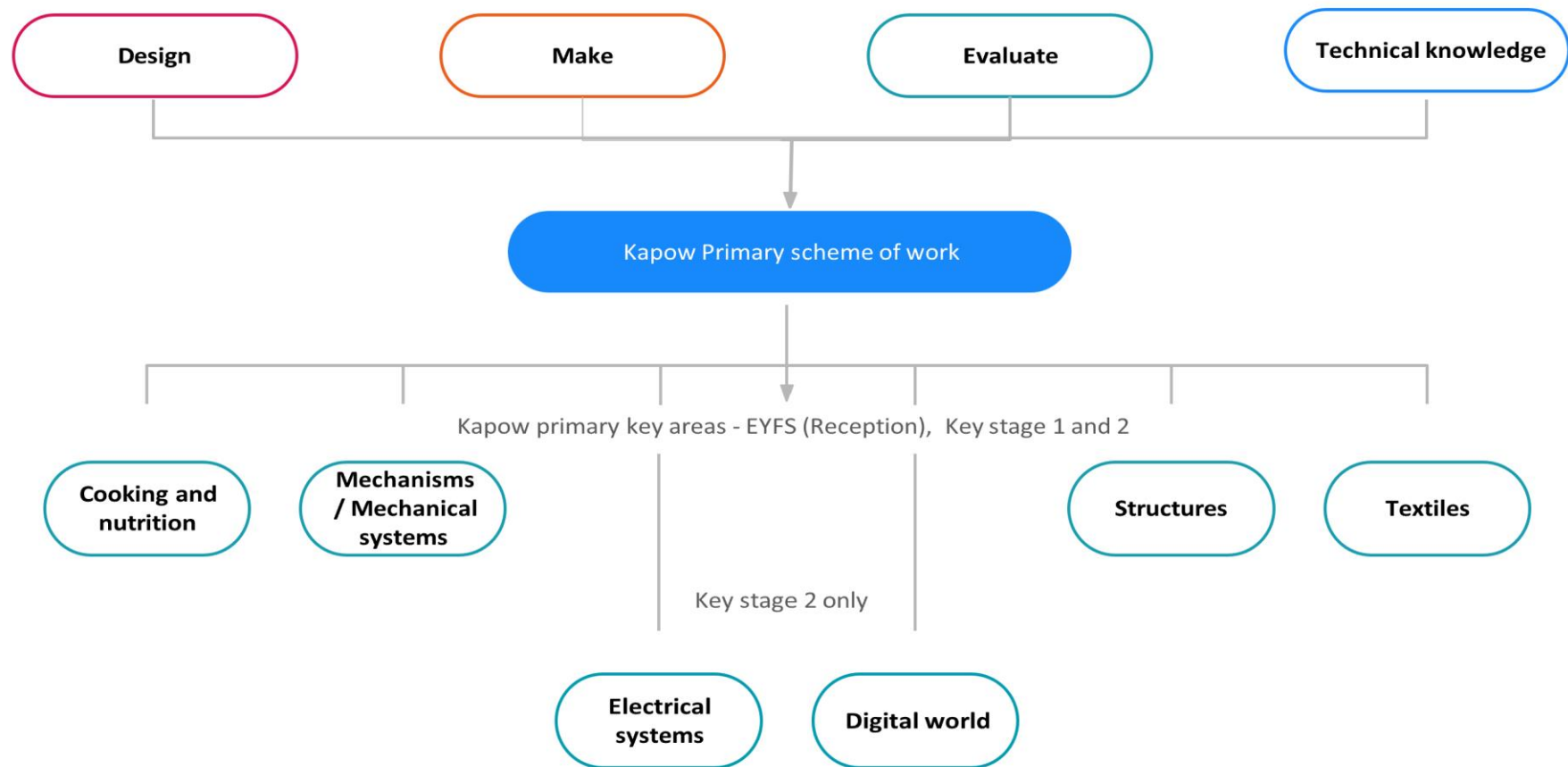
Operational series circuits, circuit components, circuit diagrams and symbols, combined to create various electrical products.



Digital world

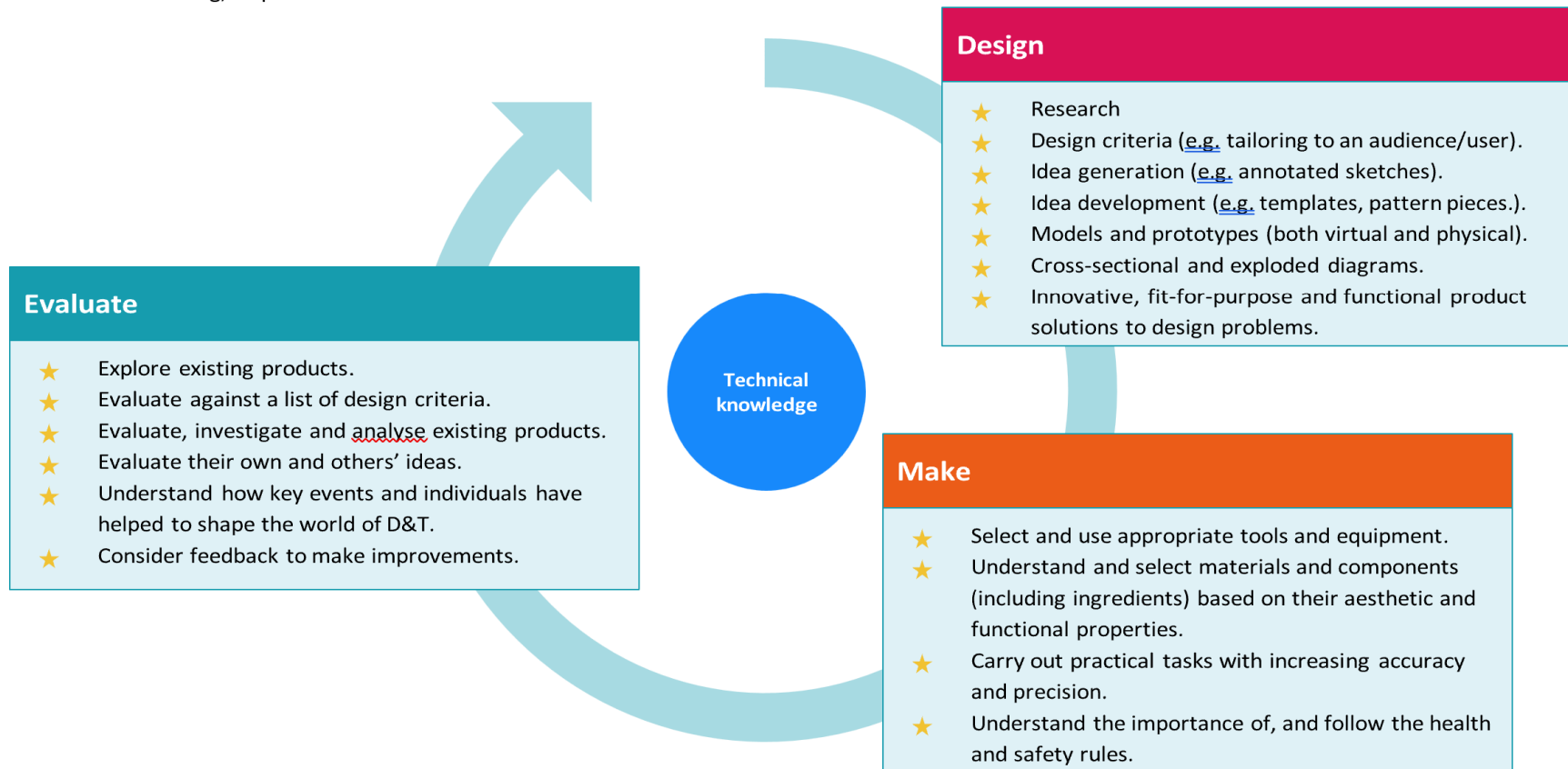
Program products to monitor and control, develop designs and virtual models using 2D and 3D CAD software.





The design process

The Design and technology National Curriculum [outlines](#) the three main stages of the design process: design, make and evaluate. Each Kapow Primary unit follows these stages, to form a full project. Each stage of the design process is underpinned by technical knowledge which encompasses the contextual, historical and technical understanding, required for each strand.



National Curriculum

KS2

Design	Make	Evaluate	Technical Knowledge	Cooking and Nutrition
● Use research and develop design criteria to inform the design of innovative, functional, appealing products that are fit for purpose, aimed at particular individuals or groups ● Generate, develop,	● Select from and use a wider range of tools and equipment to perform practical tasks [for example, cutting, shaping, joining and finishing]. ● Select from and use a wider range of materials and	● Investigate and analyse a range of existing products ● Evaluate their ideas and products against their own design criteria and consider the views of others to improve their work	● Apply their understanding of how to strengthen, stiffen and reinforce more complex structures ● Understand and use mechanical systems in their products [for example, gears, pulleys, cams, levers and linkages]	● . Understand and apply the principles of a healthy and varied diet ● Prepare and cook a variety of predominantly savoury dishes using a range of cooking techniques ● Understand seasonality,

model and communicate their ideas through discussion, annotated sketches, cross-sectional and exploded diagrams, prototypes, pattern pieces and computer-aided design	components, including construction materials, textiles and ingredients, according to their functional properties and aesthetic qualities	● Understand how key events and individuals in design and technology have helped shape the world	● Understand and use electrical systems in their products [for example, series circuits incorporating switches, bulbs, buzzers and motors] ● Apply their understanding of computing to program, monitor and control their products.	and know where and how a variety of ingredients are grown, reared, caught and processed.
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Skills Progression

Structure -Bridges

Skills	Design	Designing a stable structure that is able to support weight. Creating a frame structure with a focus on triangulation.
	Make	• Making a range of different shaped beam bridges. • Using triangles to create truss bridges that span a given distance and support a load. • Building a wooden bridge structure. • Independently measuring and marking wood accurately. • Selecting appropriate tools and equipment for particular tasks. • Using the correct techniques to saws safely. • Identifying where a structure needs reinforcement and using card corners for support. • Explaining why selecting appropriating materials is an important part of the design process. Understanding basic wood functional properties.

	Evaluate	Adapting and improving own bridge structure by identifying points of weakness and reinforcing them as necessary. Suggesting points for improvements for own bridges and those designed by others.
Knowledge	Technical	- To understand some different ways to reinforce structures. - To understand how triangles can be used to reinforce bridges. - To know that properties are words that describe the form and function of materials. - To understand why material selection is important based on properties. To understand the material (functional and aesthetic) properties of wood.

	Additional	To understand the difference between arch, beam, truss and suspension bridges. To understand how to carry and use a saw safely.

Mechanisms / Electrical systems.

Pop-up book / Doodlers

Skills	Design	• Designing a pop-up book which uses a mixture of structures and mechanisms. • Naming each mechanism, input and output accurately. Storyboarding ideas for a book.	• Identifying factors that could be changed on existing products and explaining how these would alter the form and function of the product. • Developing design criteria based on findings from investigating existing products. Developing design criteria that clarifies the target user.
	Make	• Following a design brief to make a pop up book, neatly and with focus on accuracy. • Making mechanisms and/or structures using sliders, pivots and folds to produce movement.	• Altering a product's form and function by tinkering with its configuration. • Making a functional series circuit, incorporating a motor.

		Using layers and spacers to hide the workings of mechanical parts for an aesthetically pleasing result.	- Constructing a product with consideration for the design criteria. - Breaking down the construction process into steps so that others can make the product.
	Evaluate	- Evaluating the work of others and receiving feedback on own work. - Suggesting points for improvement.	- Carry out a product analysis to look at the purpose of a product along with its strengths and weaknesses. - Determining which parts of a product affect its function and which parts affect its form. - Analysing whether changes in configuration positively or negatively affect an existing product.

			Peer evaluating a set of instructions to build a product.
Knowledge	Technical	- To know that mechanisms control movement. - To understand that mechanisms can be used to change one kind of motion into another. To understand how to use sliders, pivots and folds to create paper-based mechanisms.	- To know that series circuits only have one direction for the electricity to flow. - To know when there is a break in a series circuit, all components turn off. - To know that an electric motor converts electrical energy into rotational movement, causing the motor's axle to spin. To know a motorised product is one which uses a motor to function.

	Additional	- To know that a design brief is a description of what I am going to design and make. - To know that designers often want to hide mechanisms to make a product more aesthetically pleasing.	- To know that product analysis is critiquing the strengths and weaknesses of a product. - To know that 'configuration' means how the parts of a product are arranged.
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Cooking and Nutrition

What could be healthier?

Skills	Design	● Adapting a traditional recipe, understanding that the nutritional value of a recipe alters if you remove, substitute or add additional ingredients. ● Writing an amended method for a recipe to incorporate the relevant changes to ingredients. ● Designing appealing packaging to reflect a recipe.
	Make	● Cutting and preparing vegetables safely. ● Using equipment safely, including knives, hot pans and hobs. ● Knowing how to avoid cross-contamination. ● Following a step-by-step method carefully to make a recipe.

	Evaluate	● Identifying the nutritional differences between different products and recipes. ● Identifying and describing healthy benefits of food groups.
Knowledge	Technical	● To understand where meat comes from - learning that beef is from cattle and how beef is reared and processed, including key welfare issues. ● To know that I can adapt a recipe to make it healthier by substituting ingredients. ● To know that I can use a nutritional calculator to see how healthy a food option is. ● To understand that 'cross-contamination' means bacteria and germs have been passed onto ready-to-eat foods and it happens when these foods mix with raw meat or unclean objects.

	Additional	
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Textiles

Fastenings

Skills	Design	• Writing design criteria for a product, articulating decisions made. Designing a personalised book sleeve.
	Make	• Making and testing a paper template with accuracy and in keeping with the design criteria. • Measuring, marking and cutting fabric using a paper template. • Selecting a stitch style to join fabric. • Working neatly by sewing small, straight stitches. Incorporating a fastening to a design.
	Evaluate	• Testing and evaluating an end product against the original design criteria. • Deciding how many of the criteria should be met for the product to be considered successful. • Suggesting modifications for improvement. Articulating the advantages and disadvantages of different fastening types.

Knowledge	Technical	• To know that a fastening is something which holds two pieces of material together for example a zipper, toggle, button, press stud and velcro. • To know that different fastening types are useful for different purposes. To know that creating a mock up (prototype) of their design is useful for checking ideas and proportions.

	Additional	
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Digital World

Monitoring devices

Skills	Design	•Researching (books, internet) for a particular (user's) animal's need. •Developing design criteria based on research. •Generating multiple housing ideas using building bricks. •Understanding what a virtual model is and the pros and cons of traditional and CAD modelling. •Placing and manoeuvring 3D objects, using CAD. •Changing the properties of, or combining one or more 3D objects, using CAD.
	Make	•Understanding the functional and aesthetic properties of plastics. •Programming to monitor the ambient temperature and coding an (audible or visual) alert when the temperature rises above or falls below a specified range

	Evaluate	• Stating an event or fact from the last 100 years of plastic history. • Explaining how plastic is affecting planet Earth and suggesting ways to make more sustainable choices. • Explaining key functions in my program (audible alert, visuals). • Explaining how my product would be useful for an animal carer including programmed features.
Knowledge	Technical	• To know that a 'device' means equipment created for a certain purpose or job and that monitoring devices observe and record. • To know that a sensor is a tool or device that is designed to monitor, detect and respond to changes for a purpose. • To understand that conditional statements (and, or, if booleans) in programming are a set of rules which are followed if certain conditions are met.

	Additional	• To understand key developments in thermometer history. • To know events or facts that took place over the last 100 years in the history of plastic, and how this is changing our outlook on the future. • To know the 6Rs of sustainability. • To understand what a virtual model is and the pros and cons of traditional vs CAD modelling
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All information taken directly from Kapow.